

ELECTRIC VEHICLE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Japanese Patent Application No. 2019-188931, filed on Oct. 15, 2019, the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The art disclosed herein relates to an electric vehicle. The electric vehicle disclosed herein refers broadly to vehicles including a motor configured to drive one or more wheels. The electric vehicle encompasses electric vehicles charged by external power, hybrid vehicles including a motor and an engine, and fuel cell vehicles powered by a fuel cell, for example.

BACKGROUND

[0003] Japanese Patent Application Publication No. 2007-276605 describes an electric vehicle. This electric vehicle is provided with a body and a spare tire disposed at a rear portion of the body.

SUMMARY

[0004] Generally, an electric vehicle includes multiple electrical components, among which are high voltage components that operate under a high voltage, such as a motor configured to drive one or more wheels. Such high voltage components may be disposed at positions separated away from a rear face of the vehicle such that they are not damaged when a rear-end collision occurs. However, with a spare tire disposed at a rear portion of a body as in the aforementioned electric vehicle, the spare tire may be pushed forward upon a rear-end collision, which may result in damage to the high voltage components. The disclosure herein provides art that suppresses frontward invasion of a low voltage component when a rear-end collision occurs.

[0005] An electric vehicle disclosed herein may comprise a body; a spare tire disposed in a rear portion of the body; and a brace fixed to the body, extending along a vehicle longitudinal direction, and supporting the spare tire from below. The brace may comprise a front end fixed to the body, a rear end fixed to the body at a position rearward of the front end, and a bent portion located between the front end and the rear end. The bent portion of the brace may be located above a straight line extending between the front end and the rear end of the brace.

[0006] According to the structure described above, when a rear-end collision occurs to the electric vehicle, a compressing force is applied to the brace, which extends in the vehicle longitudinal direction, from the rear end toward the front end. Since the bent portion is disposed at an intermediate position of the brace, the brace deforms to bend at its bent portion under the above situation. Especially, the bent portion of the brace is located above the straight line connecting the front end and the rear end of the brace, thus the brace bends to cause the bent portion to protrude upward (i.e., in a mountain fold) and pushes the spare tire upward. Since the spare tire being pushed upward suppresses a frontward movement of the spare tire, invasion of the spare tire into high voltage components, such as a motor and/or

other constituent elements, can be avoided, or a degree of the invasion can be at least reduced.

BRIEF DESCRIPTION OF DRAWINGS

[0007] FIG. 1 is a side view schematically showing an overall configuration of an electric vehicle 10.

[0008] FIG. 2 is a side view schematically showing a configuration of a rear portion 12r of a body 12.

[0009] FIG. 3 is a plan view schematically showing the configuration of the rear portion 12r of the body 12.

[0010] FIG. 4 is a plan view of a brace 30.

[0011] FIG. 5 is a side view of the brace 30.

[0012] FIG. 6 schematically shows how the brace 30 and a spare tire 24 behave upon a rear-end collision.

DETAILED DESCRIPTION

[0013] In an aspect of the art disclosed herein, a body may comprise a rear floor panel located below a spare tire and a back panel located rearward of the spare tire. The rear floor panel may comprise a rear end connected to the back panel. In this case, a front end of a brace may be fixed to the rear floor panel, and a rear end of the brace may be fixed to the back panel.

[0014] In the aspect described above, the rear floor panel may comprise a front area to which the front end of the brace is fixed, and a rear area extending between the front area and the back panel. The rear area may be depressed downward relative to the front area. According to such a configuration, the spare tire can stably be supported by the brace above the depression defined by the rear area of the rear floor panel.

[0015] In an aspect of the art disclosed herein, the rear end of the brace may be located below the front end of the brace. According to such a configuration, when a rear-end collision occurs to the electric vehicle, the brace can easily be deformed into an intended shape (i.e., into a mountain fold), and the spare tire thus can be pushed upward more surely.

[0016] In an aspect of the art disclosed herein, a section of the brace from the bent portion to the rear end of the brace may be inclined downward toward the rear end of the brace. According to such a configuration, when a rear-end collision occurs to the electric vehicle, the brace can easily be deformed into the intended shape (i.e., into a mountain fold), and the spare tire thus can be pushed upward more surely.

[0017] In the aspect described above, a section of the brace from the front end to the bent portion may extend horizontally. However, in another embodiment, the section of the brace from the front end to the bent portion may be inclined downward toward the bent portion, or may be inclined upward toward the bent portion.

[0018] In an aspect of the art disclosed herein, the front end of the brace may be located below a hub mounting portion of the spare tire (i.e., a center portion of the spare tire). According to such a configuration, the brace, when deformed by a rear-end collision, pushes up a portion of the spare tire rearward of the hub mounting portion. Due to this, the spare tire is pushed upward while changing its posture, thus its frontward movement is more effectively suppressed.

[0019] In the aspect described above, the hub mounting portion of the spare tire may be removably fixed to the front end of the brace. Such a structure in which the spare tire is fixed to the brace facilitates prediction on how the spare tire will behave as the brace deforms.